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# TANDBERG

## TCD 310 Mk II

# Illustrated Parts List

### INSTRUCTIONS FOR ORDERING REPLACEMENT PARTS

For service and replacement parts contact your nearest Tandberg office or

write to: Tandbergs Radiofabrikk A/S  
Service and Spares Department  
P.O. Box 218  
N 1301 Sandvika, Norway

Telex: 18007 kurer n

When ordering please quote the model and serial numbers together with the ordering number and the full description of each part required. The serial number is a seven digit number found on the rear of the apparatus.

Example: Model TCD 310 MkII      Serial number xxxxxxxx  
994119      Knapp

Note! The numbers on the illustrations are index numbers and must not be used when ordering. Please refer to the parts list for the ordering number and description.

\* These parts are not available as replacement parts.

### INSTRUKS FOR BESTILLING AV DELER

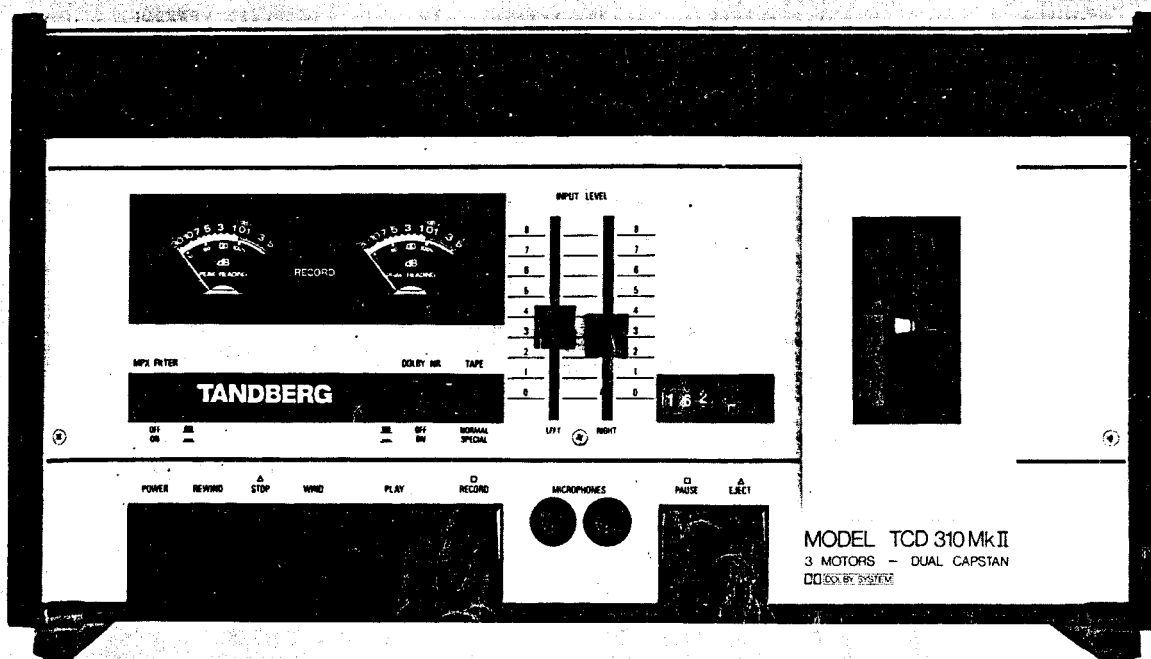
For service og servicedeler kontakt nærmeste Tandberg kontor eller bruk adressen som er vist ovenfor.

Modell og serienummer må alltid oppgis ved bestilling av deler. Bestillingsnr. og beskrivelse finnes i listen. Det 7-sifrede serienr. finnes på baksiden av apparatet.

Eksempel: Modell TCD 310 MkII      Serienr. xxxxxxxx  
994119      Knapp

Merk! Tallene på tegningene er indeksnumre og må ikke brukes ved bestilling. Bestillingsnr. og beskrivelse finnes i listen.

\* Leveres ikke som servicedel.



# Chassis assembly

SPECIFY THIS WHEN ORDERING				Reference
Index	Ordering No.	Beskrivelse (merknader)	Description (notes)	
1	* 995103	CHASSIS-ENHET PLATE (LEV. M/INDEX 2,3)	CHASSIS ASSEMBLY PLATE, TOP (SUPPLIED WITH INDEX 2 AND 3)	INPUT LEVEL MPX FILTER, DOLBY NR., TAPE
2	313191	VINDU	WINDOW, COUNTER, PLASTIC	
3	292581	PLATE	MASK, FELT	
4	994119	KNAPP	KNOB, BLACK, PLASTIC, WITH SPRING	
5	353061	KNAPP	BUTTON, PUSH, BLACK, PLASTIC	
6	294556	SKRUE	SCREW, PLATE, 3/8" NO. 4 CSK HD	POWER, REWIND, WIND, PAUSE EJECT
7	995105	SKINNE	PLATE, TOP, REAR, WITH MESH	
8	309060	SKRUE	SCREW, PLATE, 1/4" NO. 6 PAN HD	
9	290447	SKRUE	SCREW, PLATE, 3/8" NO. 6 PAN HD	
10	995113	DEKSEL (LEV. M/INDEX 11)	COVER (SUPPLIED WITH INDEX 11)	
11	343694	VINDU	WINDOW, PLASTIC	PLAY STOP
12	359928	SKINNE (LEV. M/INDEX 13)	PLATE, FRONT (SUPPLIED WITH INDEX 13)	
13	*	AKSEL	ROD	
14	354462	KNAPP	BUTTON, BLACK, PLASTIC	
15	352429	KNAPP	BUTTON, BLACK, PLASTIC	
16	350582	FJAR	SPRING	MICROPHONES MICROPHONES
17	352263	TAPP	PEG	
18	354296	FJAR	SPRING	
19	354110	KNAPP	BUTTON, BLACK, PLASTIC	
20	350748	KNAPP	BUTTON, BLACK, PLASTIC	
21	350396	HYLSE	ARM, PLASTIC	115/230V 120/240V
22	227899	SKRUE	SCREW, PLATE, 1/4" NO. 6 FLANGE HD	
23	207418	LODDEØRE	TAG, SOLDER, 4.2 MM	
24	274162	KONTAKT	SOCKET, 5 PIN DIN 180 DEGREES	
25	294420	JACK	SOCKET, JACK, 3 POLE 1/4 IN.	
26	313837	SKIVE	SURROUND, DIN SOCKET, PLASTIC	ENGLISH VERSION U.S.A. VERSION EUROPEAN VERSION SCANDINAVIAN VERSION
27	312156	MUTTER	NUT, PLASTIC	
28	286267	FJAR	SPRING, FLAT	
29	994152	FOT (LEV. M/INDEX 28-30)	FOOT, PAIR (SUPPLIED WITH INDEX 28 TO 30 INCL.)	
30	324297	PLATE	PLATE	
31	309693	FOT	FOOT, RUBBER	U.S.A. VERSION
32	348995	SKRUE	SCREW, PLATE, 1/4" NO. 4 FLANGE HD	
33	262984	PLATE	PANEL, PLASTIC, BLACK	
34	309599B	SKRUE	SCREW, PLATE, 5/8" NO. 6 PAN HD, BLACK	
35	290211	PLATE	PLATE, SIDE WALL, LEFT	
36	272739	PLATE	PLATE, ISOLATION	RADIO OUTPUT, INPUT PHONES
37	349030	MUTTER	NUT, PLATE	
38	347996	TRANSFORMATOR	TRANSFORMER	
39	334807	TRANSFORMATOR	TRANSFORMER	
40	202332	SKRUE	SCREW, 4 X 8 MM PAN HD	
41	305885A	SKIVE	WASHER, 4.3 MM	S101, 230/240 V S101, 115 V S101, US BASE
42	227949	PLATE	PLATE, SIDE WALL, RIGHT	
43	301596A	FOT	FOOT, RUBBER	
44	297925	PLATE	COVER, BOTTOM	
45	350230	SKRUE	SCREW, PLATE, 5/16" NO. 6 FLANGE HD, BLACK	
46	300612A	SKINNE	PLATE, REAR WALL	
47	267697	KLAMMER	GUIDE, PLASTIC	
48	299621	LEDNING	CABLE, POWER, ENGLAND, WITHOUT PLUG	
49	335569	LEDNING	CABLE	
50	335927	LEDNING	CABLE, POWER, WITH PLUG	
51	284744	HYLSE	CABLE, POWER, WITH PLUG	
52	281154	TUBE	GROMMET, CABLE, POWER	
53	273832	SKIVE	TUBE, CABLE, POWER	
54	*	TRANSISTOR	WASHER, 22 X 10.2 X 0.56 MM	
55	*	SKIVE (LEV. M/INDEX 48)	TRANSISTOR	
56	296417	SKRUE	WASHER (SUPPLIED WITH INDEX 48)	
57	271367	MUTTER	WASHER (SUPPLIED WITH INDEX 48)	
58	309247	BRACKET	SCREW, 2.6 X 8 MM PAN HD	
59	290842	SKRUE	NUT, 2.6 MM	
60	274162	KONTAKT	BRACKET	
	283773	KONTAKT	SCREW, 3 X 6 MM PAN HD	
	294420	JACK	SOCKET, 5 PIN DIN 180 DEGREES	
	310397	PLATE	SOCKET, PHONO	
	277509	HOLDER	SOCKET, JACK, 3 POLE 1/4 IN.	
	272207	SIKRING	SCREEN	
	289629	SIKRING	HOLDER, FUSE	
	307444	SIKRING	FUSE, 1.6 A, 5 X 20 MM, SLOW	
			FUSE, 2 A, 1 1/4" X 1/4"	
			FUSE, 2 A, 1 1/4" X 1/4"	

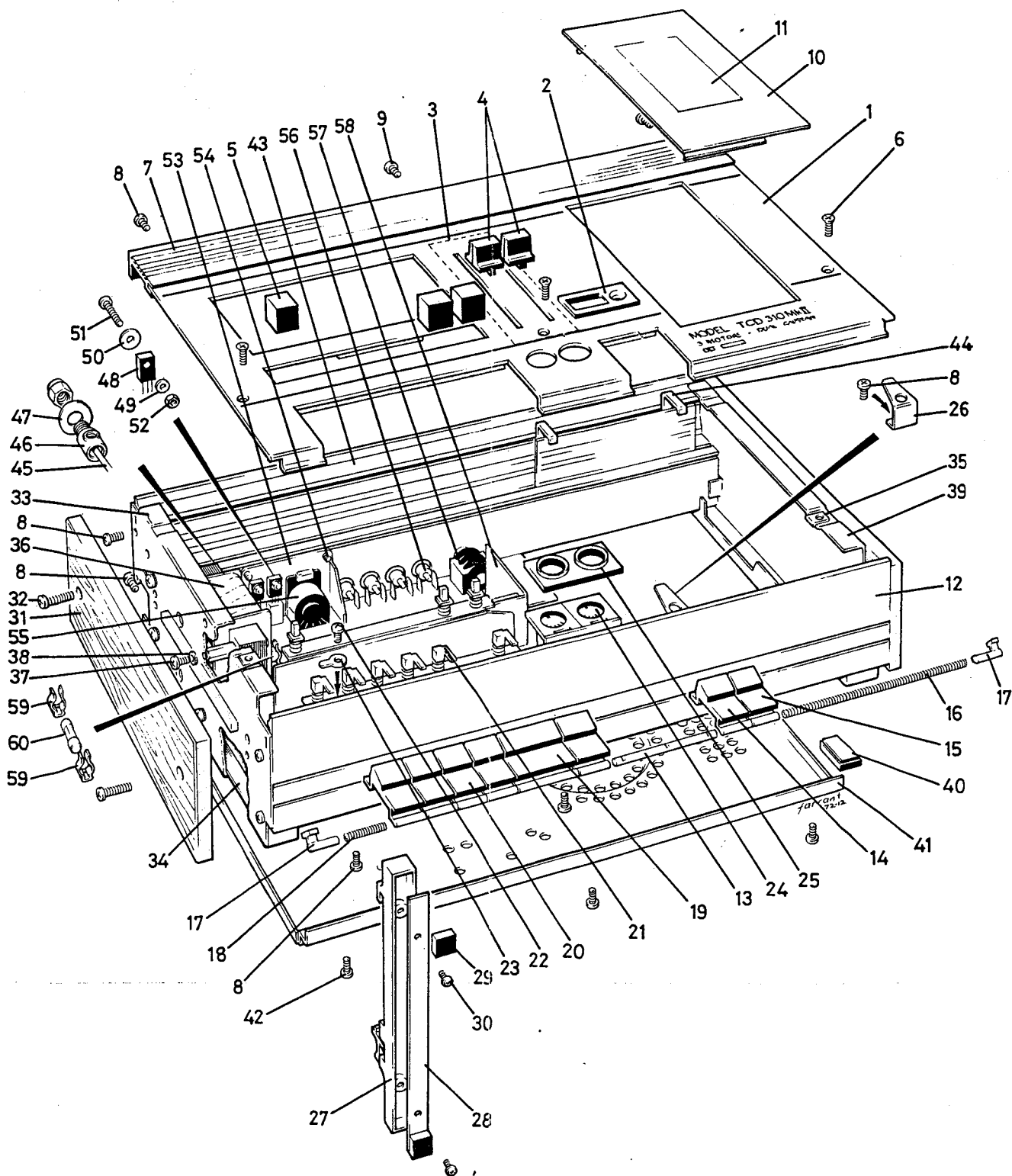


Fig.1 Chassis assembly

# Meter board assembly

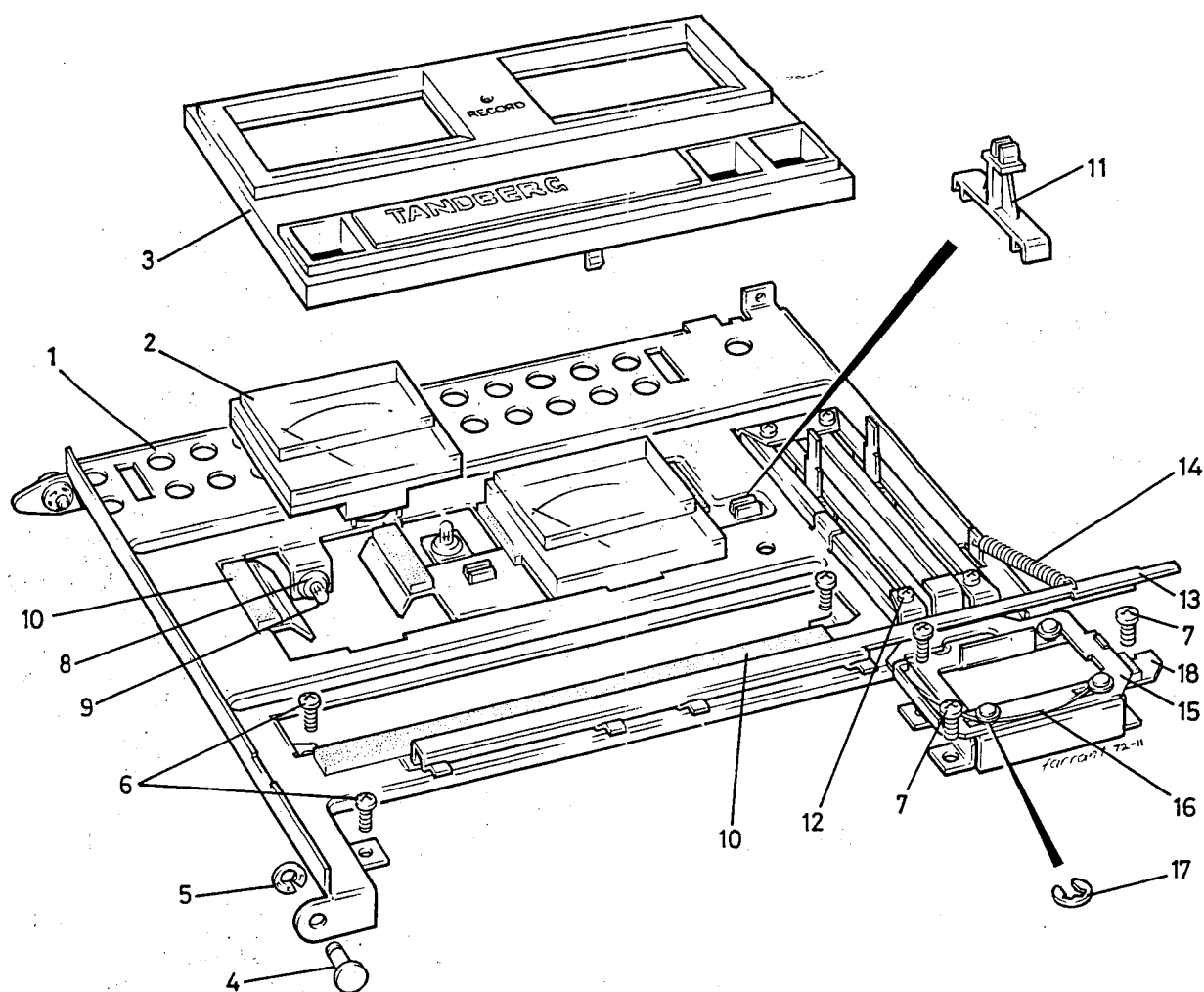


Fig.2 Meter board assembly

SPECIFY THIS WHEN ORDERING				
Index	Ordering No.	Beskrivelse (mærknader)	Description (notes)	Reference
1	995104	INSTRUMENTKORT-ENHET	METER BOARD ASSEMBLY	REC. LAMP, METER ILLUM.
2	348075	RAMME (LEV. M/INDEX 1C)	FRAME (SUPPLIED WITH INDEX 10)	
3	995100	INSTRUMENT	METER	
4	303701	HOLDER	HOLDER, METER	
5	245649	AKSEL	POST, PIVOT	
6	220392	SKIVE	RING, CIRCLIP, 4 MM	
7	309060	SKRUE	SCREW, PLATE, 1/4" NO. 4 PAN HD	
8	285720	SKRUE	SCREW, PLATE, 1/4" NO. 6 PAN HD	
9	995102	TUBE	GROMMET, RUBBER	
10	250477	LAMPE	BULB, 14 V 80 MA	
11	289765A	LIST	STRIP, FOAM RUBBER, 3 x 9 MM	
12	269255	KLAMMER	GUIDE, PLASTIC	
13	310123	SKRUE	SCREW, 3 x 4 MM PAN HD	
14	279040	SKINNE	ARM, LOCKING	
15	291726	FJÆR	SPRING	
16	291022	RAMME	PLATE	
17	239651	FJÆR	SPRING	
		SKIVE	RING, CIRCLIP, 3.2 MM	

# Drive assembly

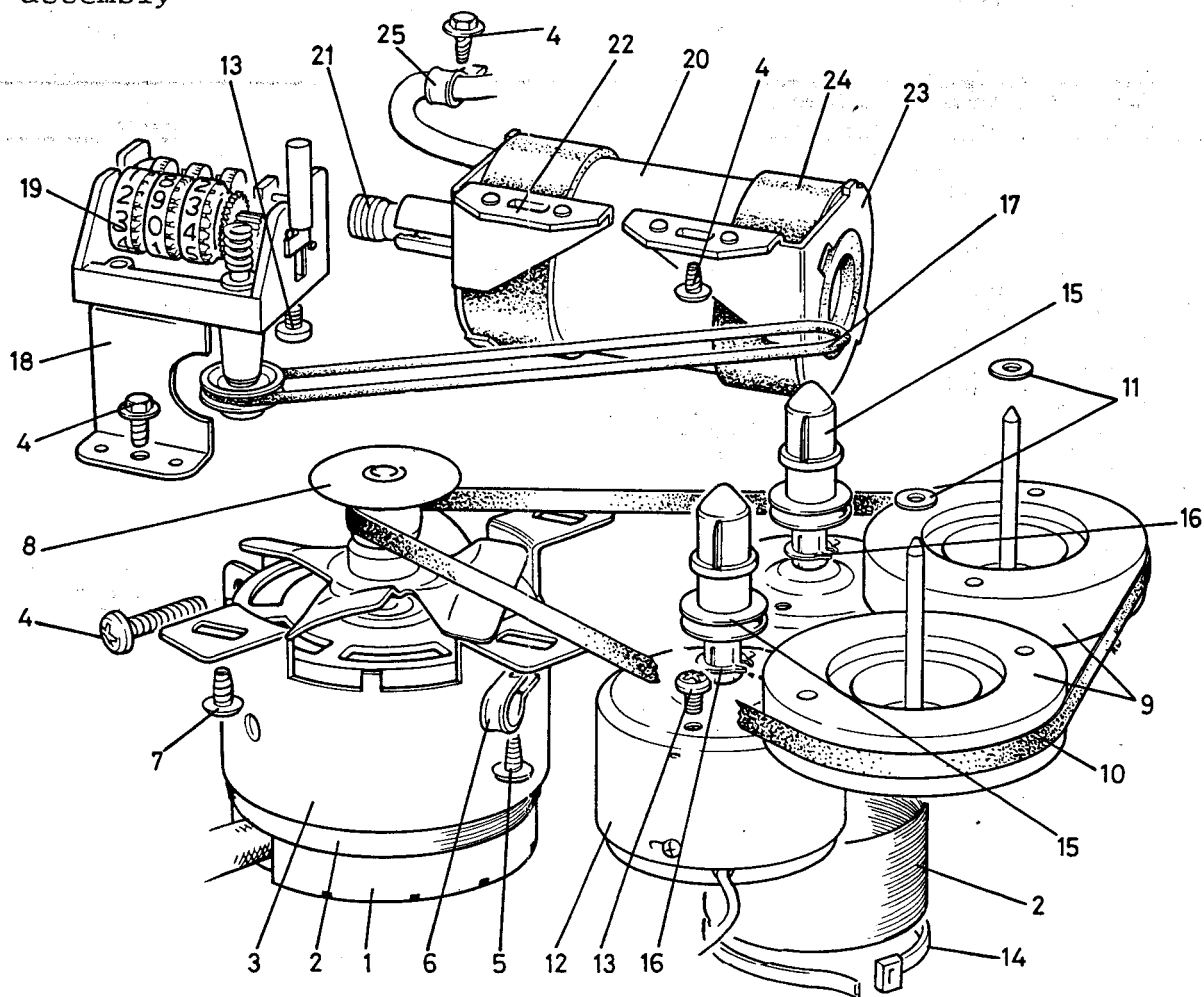


Fig. 3 Drive assembly

SPECIFY THIS WHEN ORDERING		Description (notes)	Reference
Index	Ordering No. Beskrivelse (merknader)		
1	280405	FREMDRIFTS-ENHET	50 HZ 60 HZ
2	306775	MOTOR	
3	302645	SKJERM	
4	262984	KLAMMER	
5	288141	SKRUE	
6	215507	SKRUE	
7	346854	KLAMMER	
8	994158	SKRUE	
9	994159	DRIVHJUL	
10	994111	DRIVHJUL	
11	994183	SVINGHJUL	
12	285369	(PARVIS TILPASSET, OG MED INDEX 10)	
13	284823	RING	
14	269255	SKIVE	
15	319506	MOTOR	
16	994113	SKRUE	
17	213826	BAND	
18	309600	STRAP, PLASTIC	
19	286597	AKSEL	
20	280132	(LEV. M/INDEX 16)	
21	994184	RING	
22	264212A	RING, RETAINING, EXTERNAL, 6 MM	
23	995101	BELT, DRIVE, RUBBER	
24	302300	BRACKET, SUPPORT, COUNTER	
25	300942A	COUNTER	
	202684	SOLENOID	L1, L2, START SOLENOID
		SKRUE, NYLON	
		BRACKET	
		BRACKET	
		HOUSING, RUBBER	
		CLAMP, CABLE, NYLON, 5 MM	

# Motor board assembly

SPECIFY THIS WHEN ORDERING				Reference
Index	Ordering No.	Beskrivelse (merknader)	Description (notes)	
1	*	MOTORPLATE-ENHET	MOTOR BOARD ASSEMBLY	CASS. ILLUM.
2	*	PLATE	PLATE, SUPPCRT, MOTOR	
3	302020	AKSEL	POST, PIVOT	
4	245649	SKIVE	RING, CIRCLIP, 4 MM	
5	229824	KLIPS	CLIP	
6	301395	HYLSE	CAM, NYLON	
7	301747A	SKJERM	REFLECTOR, ILLUMINATION	
8	995102	LAMPE	BULB, 14 V 80 MA	
9	285720	TUBE	GROMMET, RUBBER	
10	355014	PLATE	DISC, THRUST BEARING	
11	994117	PLATE	PLATE, MOUNTING, FLYWHEEL	
12	290842	SKRUE	SCREW, 3 X 6 MM PAN HD	
13	207173	LAGER	BEARING, 2.5 MM	
14	303622	KULE	BALL, BEARING	
15	301323	ARM	LEVER, SOLENOID	
16	300964	ARM	ARM	
17	304685	FJÆR	SPRING	
18	994112	BRACKETT	BRACKET, WITH SPINDLE	
19	223675	LØDDEØRE	TAG, SOLDER, 4.2 MM	
20	346854	SKRUE	SCREW, PLATE, 3.5 X 6.3 MM HEX HD	
21	284119	VENDER	SWITCH, LEAF, N/O	MS2 MUTING, MS3 REC., MS4 CASSETTE MS1 SLIDE
22	289083	VENDER	SWITCH, LEAF, C/O, WITH BRACKET AND SCREW	
23	269255	SKRUE	SCREW, 3 X 4 MM PAN HD	PAUSE
24	994122	BRACKETT	BRACKET, SUPPORT, PUSH SWITCH	
25	300497	VENDER	SWITCH, PUSH	
26	350827	HYLSE	ARM, PLASTIC	
27	301675	ARM	LEVER, PAUSE	
28	302997	AKSEL	POST, PIVOT	
29	286051	FJÆR	SPRING	
30	303004	BRACKETT	BRACKET, SUPPORT, LEAF SWITCH	
31	994114	BRACKETT	BRACKET, EJECT MECHANISM, CASSETTE (SUPPLIED WITH INDEX 31, 32 AND 33)	
32	230363	FJÆR	SPRING	
33	230542	SKIVE	RING, CIRCLIP, 2.3 MM	
34	994124	ARM	LEVER, WITH SPINDLE	
35	230363	FJÆR	SPRING	
36	285268	ARM	LEVER	
37	230542	SKIVE	RING, CIRCLIP, 2.3 MM	
38	202303	TUBE	TUBE, RUBBER	
39	352385	BRACKETT	BRACKET, SUPPORT, CASSETTE DRAWER	
40	351581	STRØMPE	SLEEVE, RUBBER	
41	301668	AKSEL	SPINDLE	
42	237970	SKIVE	RING, CIRCLIP, 1.5 MM	
43	300490	BRACKETT	BRACKET, CASSETTE DRAWER	
44	289413	FJÆR	SPRING	
45	304678	TAPP	POST, PIVOT	
46	287380A	ARM	ARM	
47	237360	FJÆR	SPRING	
48	293824	FJÆR	SPRING	
49	304103	ARM	ARM	
50	301316	AKSEL	POST, PIVOT	
51	994120	STYRING	GUIDE, CASSETTE, LEFT (SUPPLIED WITH INDEX 52 AND 53)	
52	292875	SKRUE	SCREW, PLATE, 3/8" NO. 4 FLANGE HD	
53	291791	FJÆR	SPRING, CASSETTE DRAWER, LEFT	
54	299606	SKRUE	SCREW, PLATE, 3/16" NO. 2 PAN HD	
55	252158	LIST	STRIP, FOAM RUBBER, 6 X 7 MM	
56	994121	STYRING	GUIDE, CASSETTE, RIGHT (SUPPLIED WITH INDEX 53 AND 56)	
	290110	FJÆR	SPRING, CASSETTE DRAWER, RIGHT	

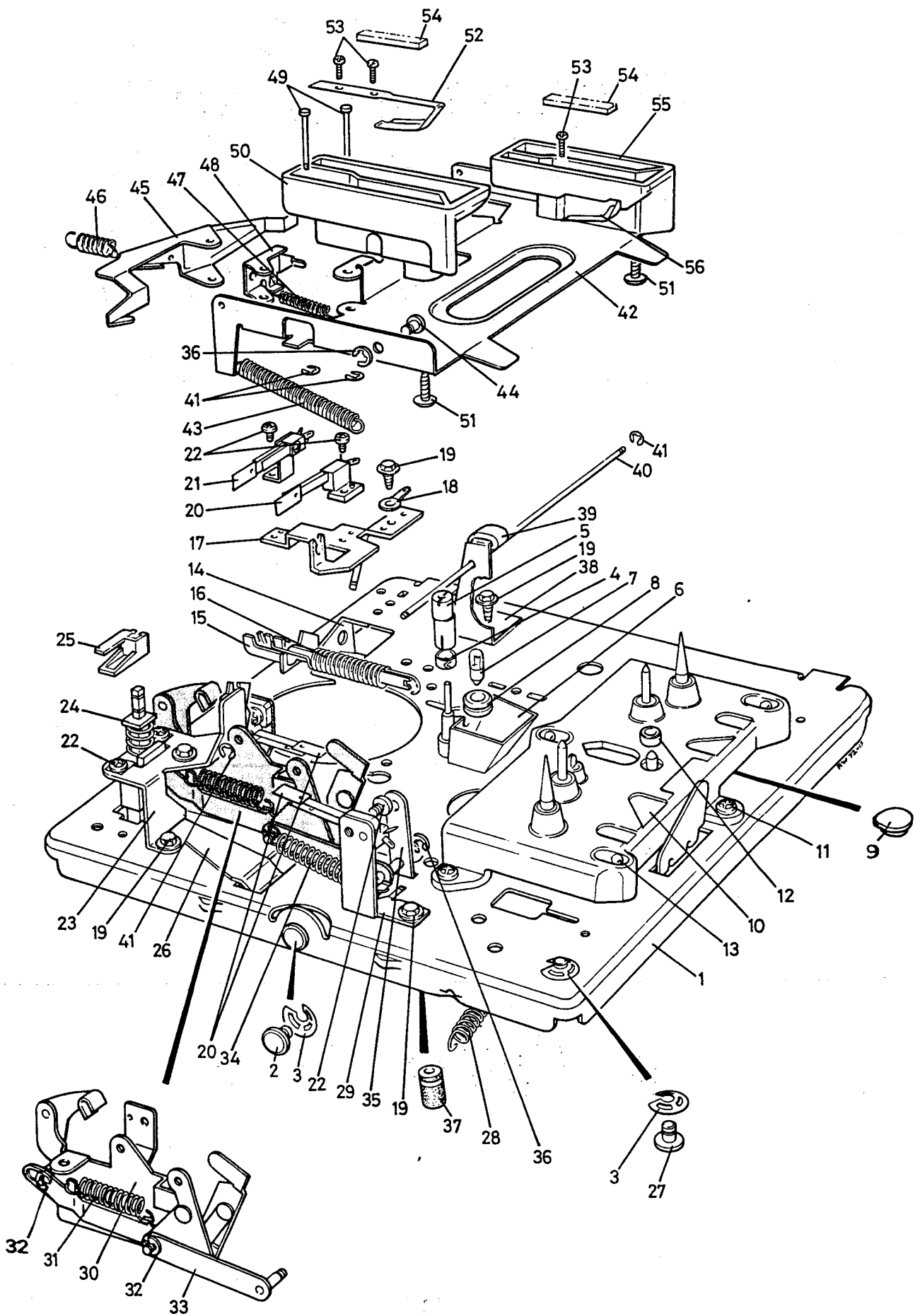


Fig. 4 Motor board assembly

# Head plate assembly

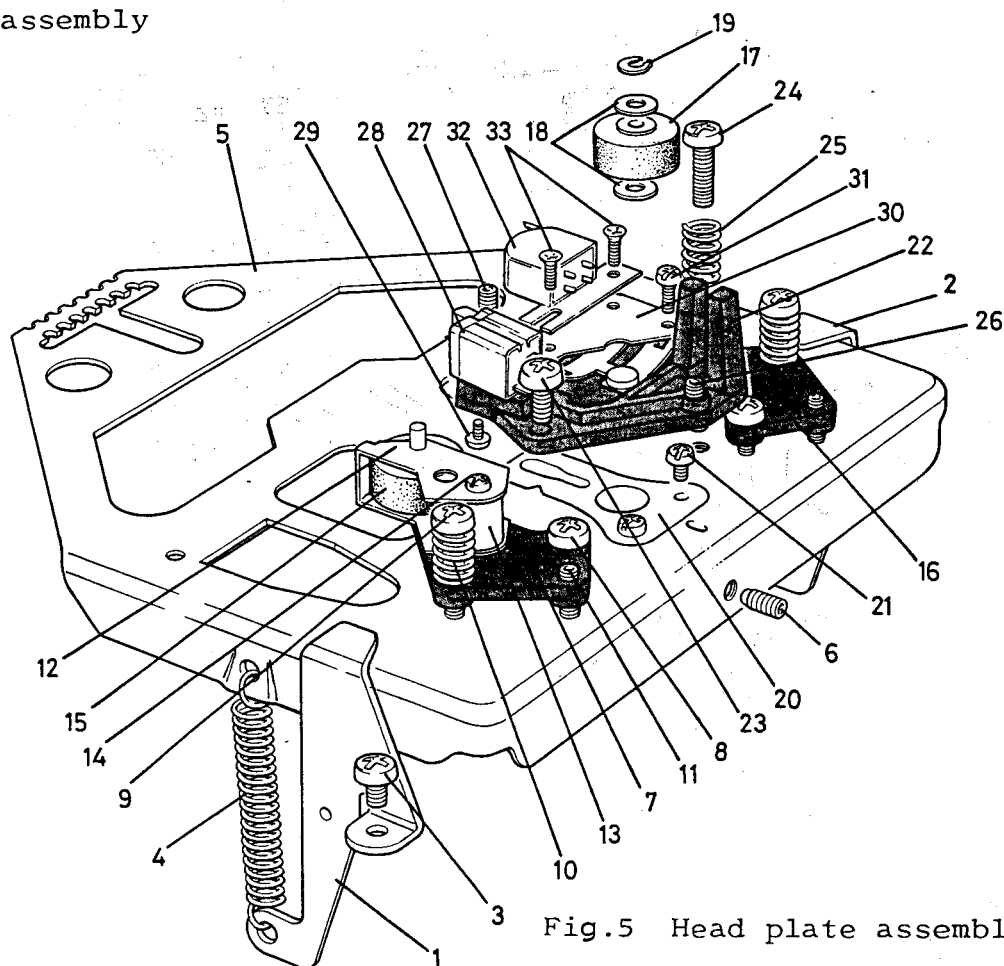


Fig.5 Head plate assembly

SPECIFY THIS WHEN ORDERING				Reference
Index	Ordering No.	Beskrivelse (merknader)	Description (notes)	
	*	HODEBRO-ENHET	HEAD PLATE ASSEMBLY	
1	304333A	ARM	BRACKET, GUIDE, HEAD PLATE, LEFT	
2	302652B	ARM	BRACKET, GUIDE, HEAD PLATE, RIGHT	
3	269255	SKRUE	SCREW, 3 X 4 MM PAN HD	
4	287732	FJÆR	SPRING	
5	*	PLATE	PLATE, MOUNTING, HEAD	
6	890002	SKRUE	SCREW, SET, 3 X 7 MM	
7	994191	PLATE	PLATE, PRESSURE, LEFT	
8	292523	SKRUE	(LEV. M/INDEX 8-15) SCREW, 3 X 8 MM PAN HD	
9	293852	SKRUE	SCREW, 3 X 15 MM PAN HD	
10	240406A	FJÆR	SPRING	
11	890003	SKRUE	SCREW, SET, 3 X 8 MM	
12	303270A	BØYLE	BRACKET, U-SHAPED	
13	300339	BOSS	SPACER	
14	292839	SKRUE	SCREW, 2 X 12 MM PAN HD	
15	860004A	HJUL	ROLLER, PRESSURE, RUBBER	
16	994192	PLATE	PLATE, PRESSURE, RIGHT	
17	860004A	HJUL	(SUPPLIED WITH INDEX 8 TO 15 INCL.) ROLLER, PRESSURE, RUBBER	
18	244377	SKIVE	WASHER, 6 X 2,5 X 0,3 MM	
19	212145	RING	RING, RETAINING, EXTERNAL, 2,5 MM	
20	285699A	FJÆR	SPRING, FLAT	
21	294520	SKRUE	SCREW, 2,3 X 3 MM PAN HD	
22	994104	PLATE	PLATE, MOUNTING, HEAD	
23	290842	SKRUE	SCREW, 3 X 6 MM PAN HD	
24	292171	SKRUE	SCREW, 3 X 12 MM PAN HD	
25	240406A	FJÆR	SPRING	
26	890003	SKRUE	SCREW, SET, 3 X 8 MM	
27	890000	SKRUE	SCREW, SET, 3 X 5 MM	
28	282086	HODE	HEAD, ERASE	
29	290806	SKRUE	SCREW, 1,7 X 3 MM PAN HD	
30	287926A	PLATE	PLATE	
31	292487	SKRUE	SCREW, 2 X 5 MM PAN HD	
32	994180	HODE	HEAD, RECORD AND PLAY	
33	294168	SKRUE	SCREW, 2 X 6 MM CSK HD	



# Switches and connectors

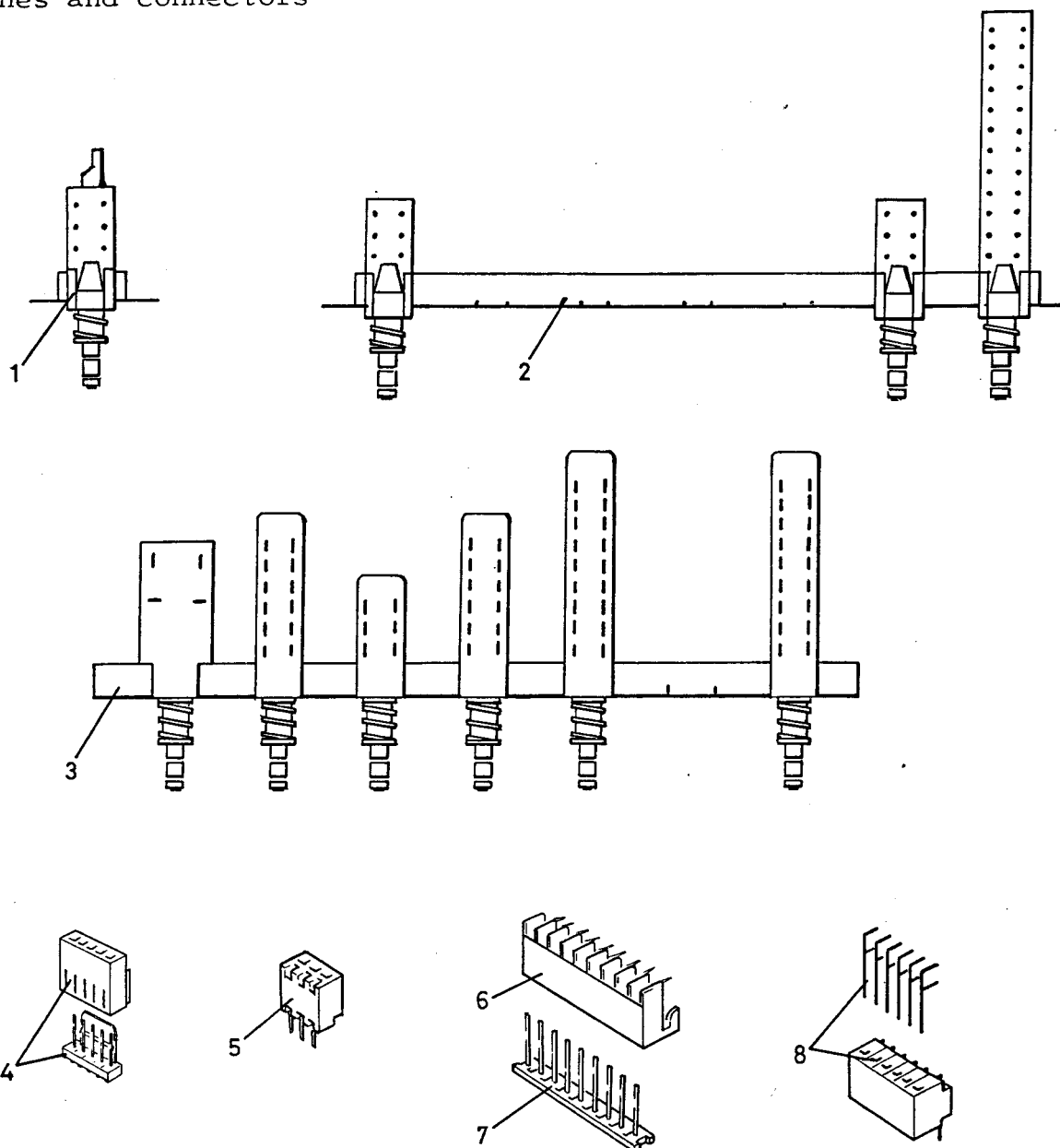


Fig.6 Switches and connectors

Index	SPECIFY THIS WHEN ORDERING		Description (notes)	Reference
	Ordering No.	Beskrivelse (merknader)		
1	*	VENDERE	SWITCHES	PAUSE MPX FILTER, DOLBY NR., TAPE POWER, REWIND, STOP, WIND, PLAY, RECORD
2	30C497	VENDER	SWITCH, PUSH	
	284902	VENDER	SWITCH, PUSH	
3	308156	VENDER	SWITCH, PUSH	
4	*	KONTAKTER	CONNECTORS	
	995818	KONTAKT	CONNECTOR, 2 POLE, SMALL	
	995819	KONTAKT	CONNECTOR, 3 POLE, SMALL	
	995820	KONTAKT	CONNECTOR, 4 POLE, SMALL	
	995821	KONTAKT	CONNECTOR, 5 POLE, SMALL	
5	318320	KONTAKT	CONNECTOR, FIXED, 3 POLE	
6	347551	KONTAKT	CONNECTOR, FIXED, 9 POLE	
7	346222	PLINT	CONNECTOR, FIXED, 9 POLE	
8	996302	KONTAKT	CONNECTOR, 3 POLE, BLACK	
	996303	KONTAKT	CONNECTOR, 6 POLE, BLACK	

Printed circuit boards

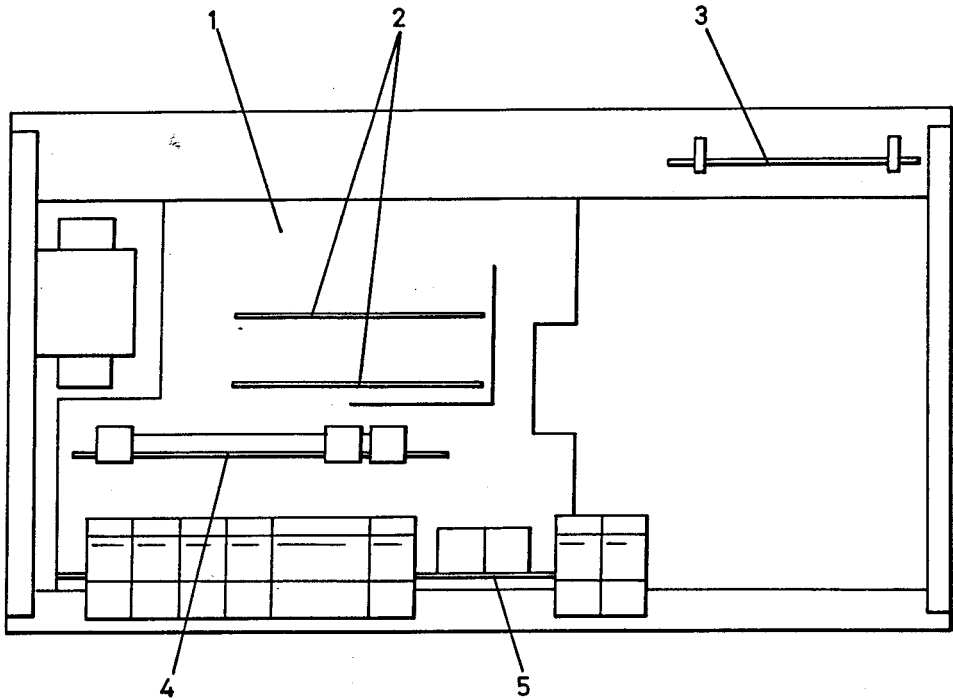


Fig.7 Printed circuit boards

Index	SPECIFY THIS WHEN ORDERING		Description (notes)	Reference
	Ordering No.	Beskrivelse (merknader)		
1	*	TK PLATER	PRINTED CIRCUIT BOARDS	A1
2	994194	KORT	BOARD, MOTHER	A4
3	994197	KORT	BOARD, DOLBY	A5
4	994198	KORT	BOARD, OSCILLATOR	A3
5	994196	KORT	BOARD, AMPLIFIER, 2	A2, DIN MIC. SOCKET
	994195	KORT	BOARD, AMPLIFIER, 1	A2, JACK MIC. SOCKET
	994199	KORT	BOARD, AMPLIFIER, 1	

# TANDBERG

## TCD 310 Mk II

Tillegg og rettelser til Illustrert deleliste

Additional information and corrections to Illustrated Parts List

Side Page	Index	Del	Part	Correct Part. No.	Merknader Notes
3	36	Transformator	Transformer 115/230 V	358269	
	45	Ledning	Cable power, England	985356	English version
4	18	Vippe	Lever	293407A	
5	4	Skrue	Screw 3.5 x 6.3 mm	346854	
	17	Ring	Belt drive, rubber	300001	Below s.no. 4415300, see Figure 1
	17B	Ring	Belt drive, rubber	309600	From s.no. 4415301, see Figure 2
	15	Aksel	Spindle, tape reel	994113	Below s.no. 4415300, see Figure 1
	15B	Aksel	Spindle, tape reel	994187	From s.no. 4415301, see Figure 2
8	28	Hode	Head, erase, Tandberg	716331	Innføring av Tandberg viskehode. Ved utskiftning erstatt med samme hodetype. Se Figur 3. Introduction of Tandberg erase head. Replace with same type of head. See Figure 3.
		Skrue	Screw, 1.2 x 11.5 mm	890008	
		Skive	Washer, 1.4 mm	356947	
	32	Hode	Head, rec./playback	995115	U.S.-version
		Vender	Switch, push	358700	
9	2	Vender	Switch, push	358700	From s.no. 4406300

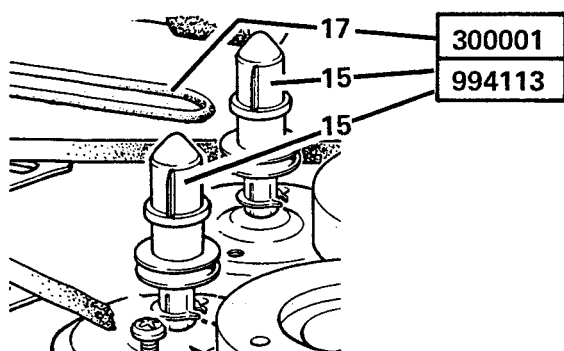


Fig. 1. Counter drive belt, below s.no. 4415300  
Telleverksrem, under s.nr. 4415300

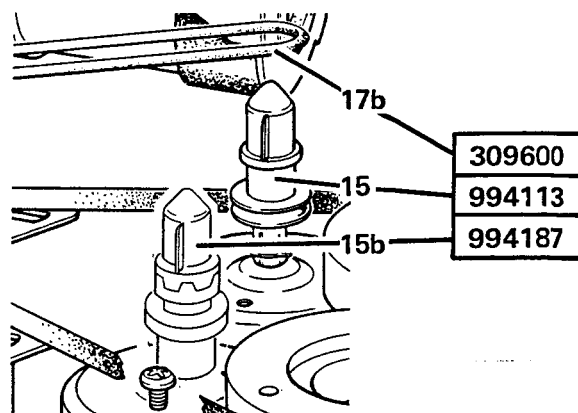


Fig. 2. Counter drive belt, above s.no. 4415300  
Telleverksrem, over s.nr. 4415300

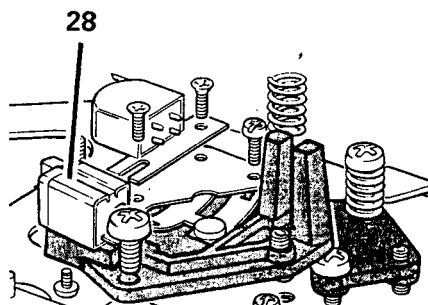
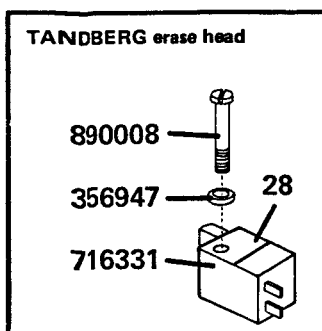


Fig. 3. Two different types of erase heads  
To typer slukkehoder

Merk: Ved utskifting, erstatt med samme type hode.  
Note: Replace with same type of head

# **TANDBERG**

## TCD 310 Mk II

### Circuit Diagram

**—TANDBERG—**  
**ZENTRAL-SERVICE**  
Jochen Schmidt  
Am Strasserfeld 2  
Telefon (0211) 203076 - Telefax (0211) 202954  
4000 DÜSSELDORF 12 UNTERBACH

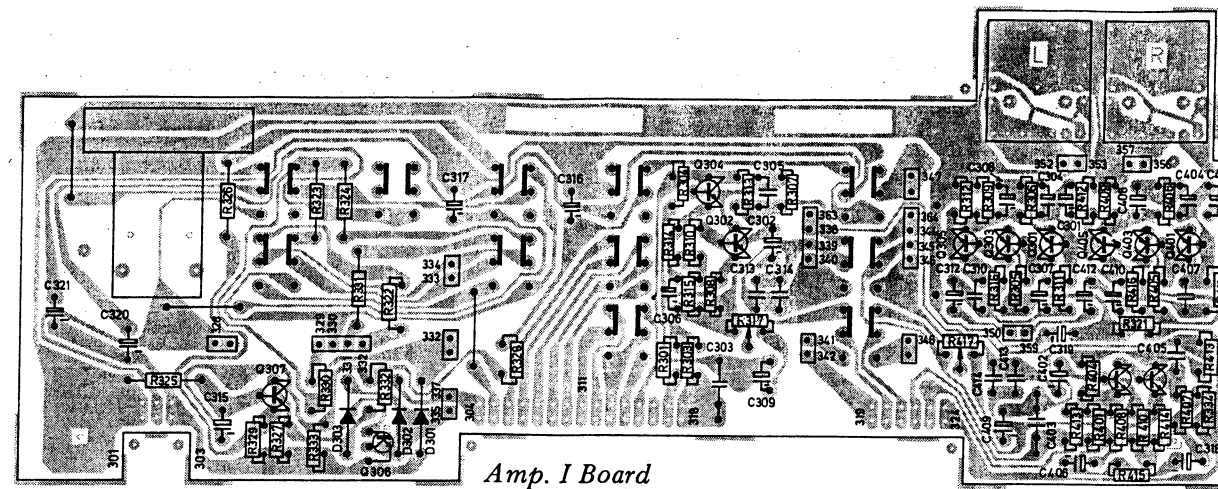
**—TANDBERG—**  
**ZENTRAL-SERVICE**  
Jochen Schmidt  
Am Strasserfeld 2  
Telefon (0211) 203076 - Telefax (0211) 202954  
4000 DÜSSELDORF 12 UNTERBACH

# TANDBERG

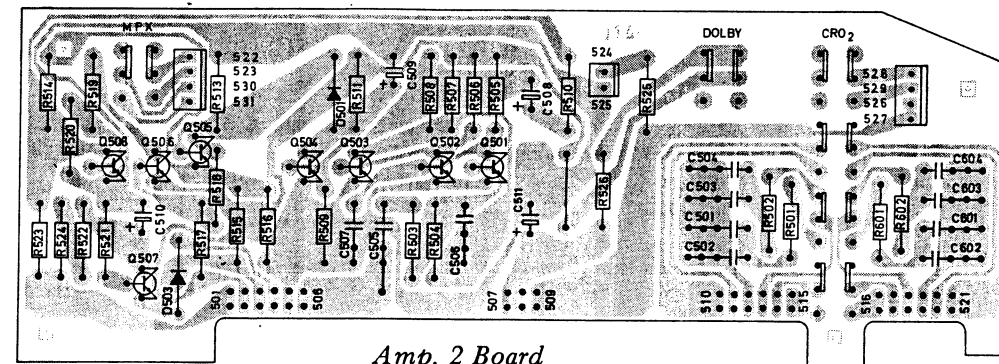
## TCD 310 Mk II

Tillegg og rettelser til Illustrert deleliste

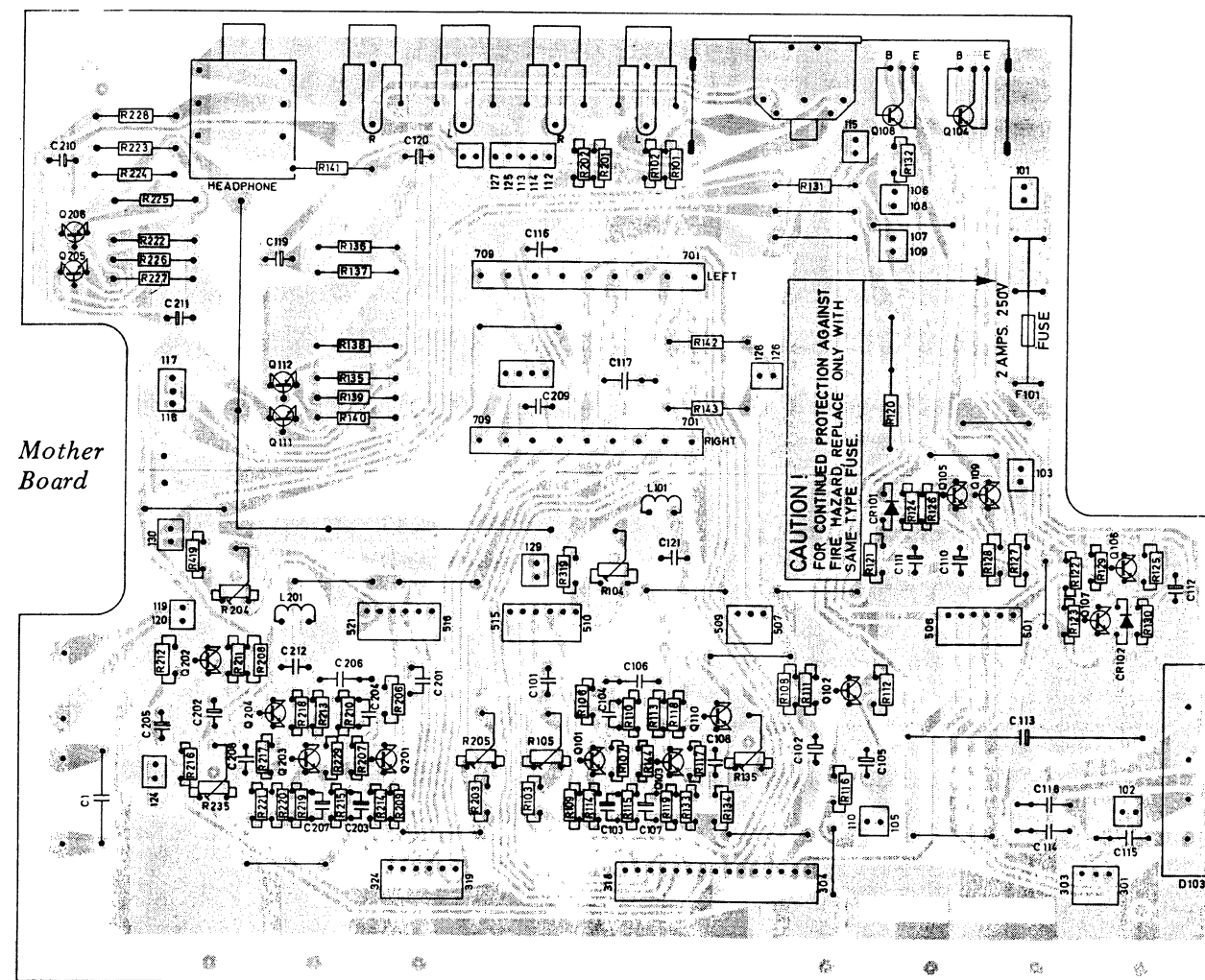
Additional information and corrections to Illustrated Parts List



Amp. 1 Board



Amp. 2 Board



Mother Board

Side Page	Index	Del	Part	Correct Part. No.	Merknader Notes
3	36	Transformator	Transformer 115/230 V	358269	
	45	Ledning	Cable power, England	985356	English version
4	18	Vippe	Lever	293407A	
5	4	Skrue	Screw 3.5 x 6.3 mm	346854	
	17	Ring	Belt drive, rubber	300001	Below s.no. 4415300, see Figure 1
	17B	Ring	Belt drive, rubber	309600	From s.no. 4415301, see Figure 2
	15	Aksel	Spindle, tape reel	994113	Below s.no. 4415300, see Figure 1
8	15B	Aksel	Spindle, tape reel	994187	From s.no. 4415301, see Figure 2
	28	Hode	Head, erase, Tandberg	716331	Innføring av Tandberg viskehode. Ved utskifting erstatt med samme hodetype. Se Figur 3. Introduction of Tandberg erase head. Replace with same type of head. See Figure 3.
		Skrue	Screw, 1.2 x 11.5 mm	890008	
		Skive	Washer, 1.4 mm	356947	
9	32	Hode	Head, rec./playback	995115	U.S.-version
	2	Vender	Switch, push	358700	From s.no. 4406300

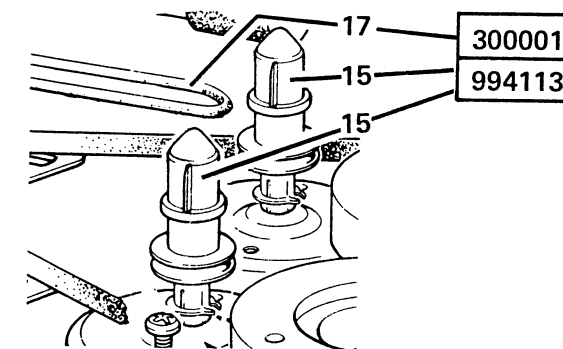


Fig.1. Counter drive belt, below s.no.4415300  
Telleverksrem, under s.nr.4415300

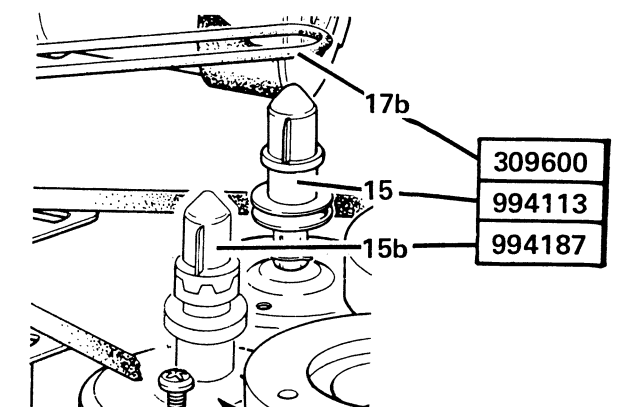


Fig.2. Counter drive belt, above s.no.4415300  
Telleverksrem, over s.nr.4415300

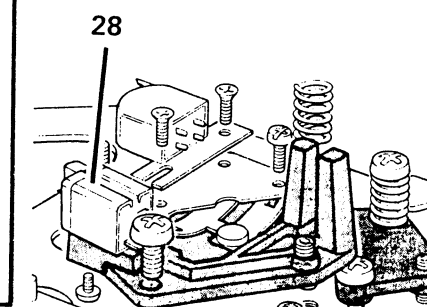
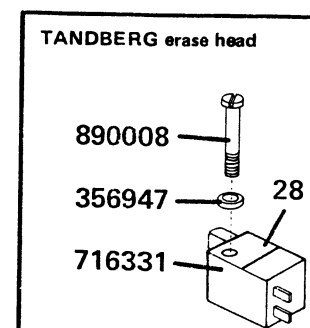
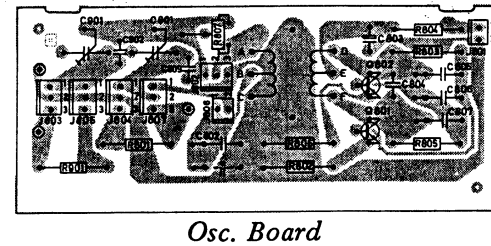
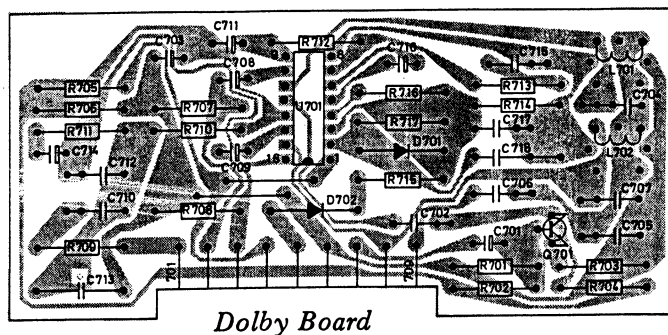
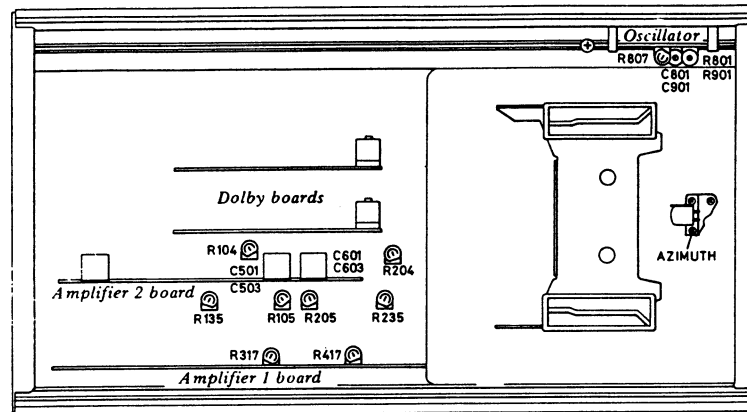


Fig.3. Two different types of erase heads  
To typer slukkehoder

Merk: Ved utskifting, erstatt med samme type hode.  
Note: Replace with same type of head



## ELECTRICAL CHECKS AND ADJUSTMENTS FOR TCD 310 Mk II



## GENERAL

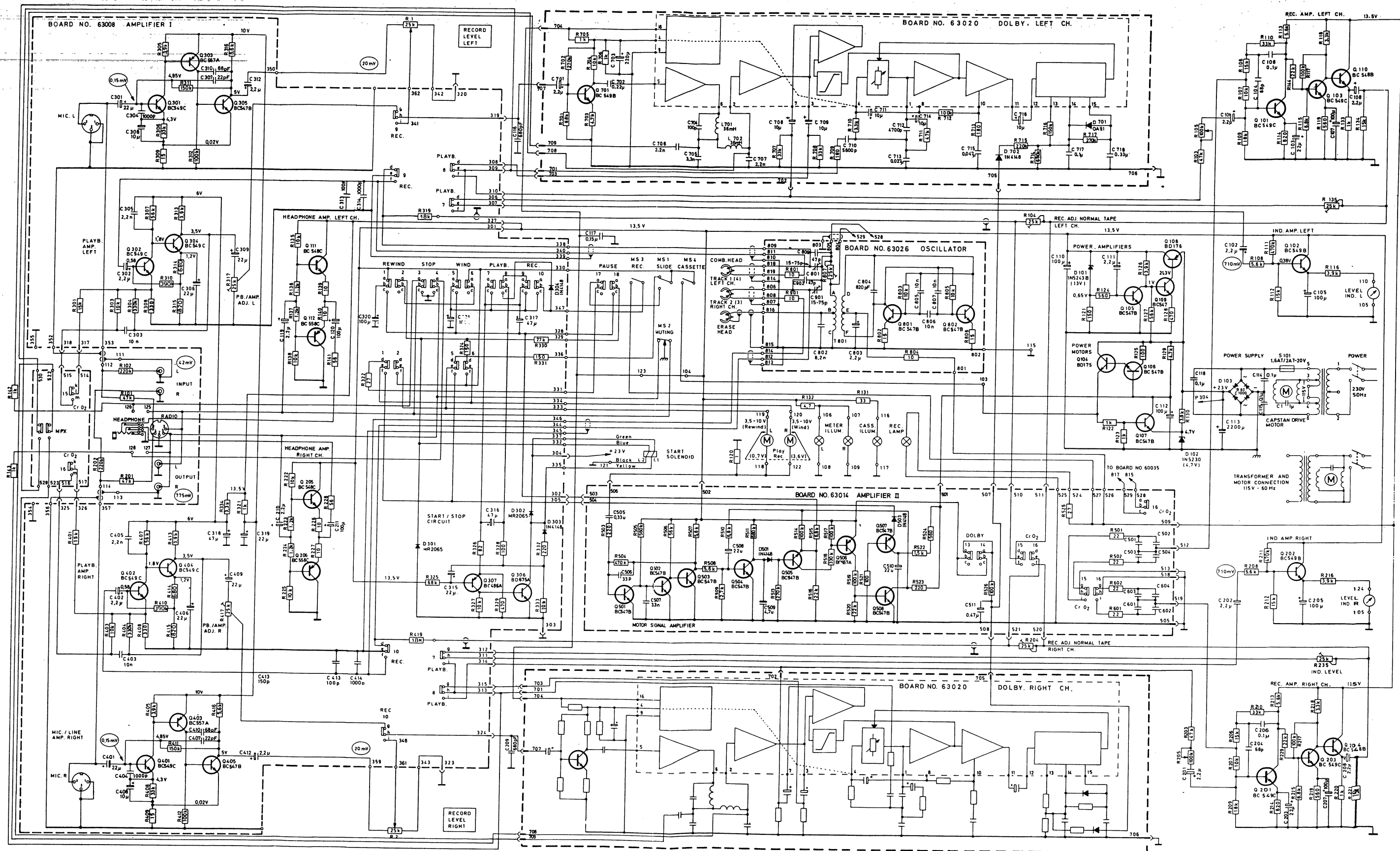
- “0 dB” level is defined as 775 mV. Thus – 5 dB equals 450 mV and – 35 dB equals 14 mV.
- Make the adjustments in the order in which they are listed here. Many of the adjustments require that previous adjustments have already been correctly made. It is especially important that adjustment for SPECIAL tape be made before adjustment for NORMAL tape.
- Clean and degauss the tape path before and after the adjustments. It is assumed that the tape path has already been correctly adjusted as described in the Service Manual for the TCD 310.

## NECESSARY EQUIPMENT

- 2 high impedance voltmeters (do NOT use universal meters).
- Frequency counter.
- Audio generator.
- Distortion meter.
- Wow meter (required for wow test only).
- Hum/noise meter (required for signal/noise test).
- Tandberg test tapes No. 21 (1,000 Hz speed test), No. 22 (3,150 Hz wow test), No. 23 (6,300 Hz azimuth) and No. 24 (1,000 Hz playback level).
- TDK C60 SA or equivalent.
- Maxell C60 UD or equivalent.

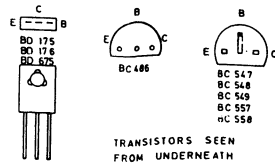
No.	Adjustment or check	Tape	Set the cassette deck to	Measuring instrument	Measure at	Correct reading	Adjust	Comments
1	Record/playback head azimuth	No. 23	Playback	Voltmeters	OUTPUT sockets	Maximum output signal. Difference between the tracks: < 4 dB	Azimuth screw on head	Adjust to best compromise
2	Playback level	No. 24	Playback	Voltmeters	OUTPUT sockets	775 mV	R317 (left channel) R417 (right channel)	—
3	Tape speed	No. 21	Playback	Frequency counter	OUTPUT socket	± 1% (990 — 1010)	—	—
4	Wow	No. 22	Playback	Wow meter (according to DIN 45507)	OUTPUT socket	≤ 0.2% (DIN 45511 peak weighted)	—	Measure at end of tape. Measure both in vertical and horizontal position.
5	Oscillator frequency	SPECIAL	SPECIAL Recording	Frequency counter	Connect inductively to erase head (see comments)	80 — 100 kHz	—	Connection is made with a coil or a few turns of ordinary wire. Instead of a frequency counter a long-wave receiver (tuned to 3rd. harmonic) can be used.
6	Oscillator erase voltage	SPECIAL	SPECIAL Recording	Voltmeter	Across erase head	28 — 32 V	—	—
7	Oscillator	SPECIAL	SPECIAL	Voltmeters	OUTPUT	≤ 2 mV	—	INPUT sockets open.

No.	Adjustment or check	Tape	Measuring instrument	Measure at	Procedure																				
2 ADJUSTMENT FOR SPECIAL TAPE																									
2.1	Bias (preadjustment)	SPECIAL	Voltmeters	R801 (left channel) R901 (right channel) see "location" drawing	Set the cassette deck to SPECIAL recording and adjust C801 (left ch.) and C901 (right ch.) to readings of approximately 6–8 mV. (Measure between ground and the side of the resistor which is connected to the head).																				
2.2	Recording level	SPECIAL	Voltmeters	OUTPUT sockets	Set the cassette deck to SPECIAL recording. R1 and R2 to mid-position. Connect an audio generator to the INPUT sockets. Adjust the generator to 400 Hz, – 5 dB (= 450 mV on the voltmeters). [– 5 dB is used instead of 0 dB in order to avoid inaccurate results caused by varying tape characteristics.]																				
					Rewind and play back. The voltmeters should now read – 5 dB (= 450 mV) ± 0.5 dB. If outside the tolerance, make a new recording while adjusting R105 (left channel) and R205 (right channel) as required. Then play back and check once more.																				
2.3	Overall frequency response (adjustment)	SPECIAL	Voltmeters	OUTPUT sockets	Set the cassette deck to SPECIAL recording. Adjust the generator to – 35 dB (= 14 mV on the voltmeters) and record a 400 Hz and a 10,000 Hz signal at this level.  Rewind and play back. Use the 400 Hz signal as a reference and check on both channels that the 10,000 Hz signal is within the following tolerance: – 0 dB to + 5 dB. If outside the tolerance adjust C801 and C901 (bias). Then make a new recording, play back and check once more.																				
2.4	Distortion	SPECIAL	Distortion meter	OUTPUT sockets	Set the cassette deck to SPECIAL recording. Generator to 1000 Hz, 0 dB (= 775 mV on the voltmeters).  Rewind and play back. Check that the distortion is ≤ 3%. If outside the tolerance adjust C801 and C901 (bias). Make a new recording, play back and check once more. Then repeat step 2.3																				
2.5	Overall frequency response (check with DOLBY)	SPECIAL	Voltmeters	OUTPUT sockets	Set the cassette deck to SPECIAL DOLBY (!) recording. Adjust the generator to – 35 dB and record the following frequencies: 400 Hz, 55 Hz, 1000 Hz, 4000 Hz, 10,000 Hz, 14,000 Hz.  Rewind and play back. Use the 400 Hz signal as a reference, and check that the other signals are within the following tolerances: 55 Hz: – 3 dB to + 2 dB      10,000 Hz: 0 dB to + 5 dB 1000 Hz: – 2 dB to + 2 dB      14,000 Hz: – 2 dB to + 5 dB 4000 Hz: – 2 dB to + 4 dB  If outside the tolerances try changing the values of C501/C502 (left ch) and C601/C602 (right ch). Increased values give higher treble response.																				
2.6	Indicators	SPECIAL	Indicators		Record a 400 Hz, 0 dB signal and adjust R135 (left ch) and R235 (right ch) to 0 dB deflection on both indicators.																				
3 ADJUSTMENT FOR NORMAL TAPE																									
3.1	Recording level	NORMAL	Voltmeters	OUTPUT sockets	Same as in step 2.2, except that the SPECIAL button is released. If outside the tolerance adjust R104 (left ch) and R204 (right ch). DO NOT TOUCH R105 OR R205.  NOTE! Adjustment of R104 and R204 will not affect the readings on the indicators of the cassette deck.																				
3.2	Overall frequency response (adjustment)	NORMAL	Voltmeters	OUTPUT sockets	Same as in step 2.3, except that the SPECIAL button is released. If outside the tolerance adjust R807. DO NOT TOUCH C801 OR C901.																				
3.3	Distortion	NORMAL	Distortion meter	OUTPUT sockets	Same as in step 2.4, except that the SPECIAL button is released. Is outside the tolerance adjust R807. Then repeat 3.2. DO NOT TOUCH C801 OR C901.																				
3.4	Overall frequency response (check with DOLBY)	NORMAL	Voltmeters	OUTPUT sockets	Same as in step 8.5, except that the SPECIAL button is released. Tolerances: 55 Hz: – 3 dB to + 2 dB      10,000 Hz: – 2 dB to + 5 dB 1000 Hz: – 2 dB to + 2 dB      14,000 Hz: – 3 dB to + 4 dB 4000 Hz: – 2 dB to + 4 dB  If outside the tolerances try changing the values of C503/504 (left ch) and C603/C604 (right ch). Increased values give higher treble response.																				
3.5	Erasure	SPECIAL	Voltmeters	OUTPUT sockets	Record a 1000 Hz, 0 dB signal. Rewind and erase. Then rewind once more and play back the erased piece. The voltmeters should read < – 62 dB.																				
3.6	Signal/noise	SPECIAL and NORMAL	Hum/noise meter (according to DIN 45405)	OUTPUT sockets	The signal/noise ratios at 3% distortion should be at least as good as specified in the table below:  <table><tr><td>DOLBY N.R.</td><td colspan="2">OFF</td><td colspan="2">ON</td></tr><tr><td>Signal/tape noise:</td><td>NORMAL</td><td>SPECIAL</td><td>NORMAL</td><td>SPECIAL</td></tr><tr><td>DIN 45511 (Geräuschspannung)</td><td>46 dB</td><td>49 dB</td><td>55 dB</td><td>58 dB</td></tr><tr><td>DIN 45511 (Fremdspannung)</td><td>46 dB</td><td>48 dB</td><td>50 dB</td><td>50 dB</td></tr></table>	DOLBY N.R.	OFF		ON		Signal/tape noise:	NORMAL	SPECIAL	NORMAL	SPECIAL	DIN 45511 (Geräuschspannung)	46 dB	49 dB	55 dB	58 dB	DIN 45511 (Fremdspannung)	46 dB	48 dB	50 dB	50 dB
DOLBY N.R.	OFF		ON																						
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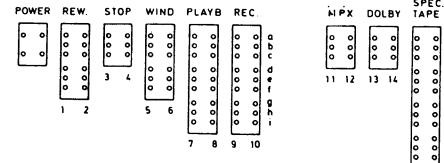


All voltages are measured with V.T.M. with input impedance min. 10 M ohms.  
All DC voltages measured without signal.  
1mV Denotes signal voltages (1000Hz)  
1mV Denotes DC voltages  
(10V) Denotes voltages in operated mode

L: Left channel (Track 1 or 4)  
R: Right channel (Track 2 or 3)  
→ = Connector  
○ 101 = Connection terminal



TRANSISTORS SEEN FROM UNDERNEATH



ALL SWITCHES IN UNOPERATED POSITION

15 16